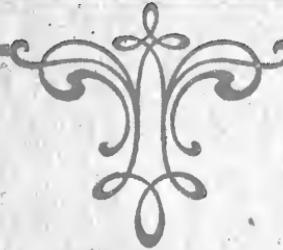


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HOW TO WORK IT









HOW TO WORK IT.

HOW TO WORK IT.

A Manual for the Use of
The Ben Day Rapid
Shading Mediums
and its Registry Attachments.



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THE BEN DAY WEIGHTED HOLDFAST AND PORTABLE SAFETY ADJUSTER FOR PRINTING FILMS.

Patented,
United States of America, Feb. 28, 1905.
Great Britain, Feb. 13, 1905.
France, Feb. 20, 1905.
Germany and Austria, Patents Pending.

For Use with the Ben Day Rapid Shading Medium
for Graining, Stippling, Lining, and Otherwise
Shading Drawings on Stone, Zinc, Copper,
Aluminum, Cardboard, Paper, Tiles,
Glass or Other Flat Surfaces.

General Advantages of the Apparatus.

It requires no "setting up," is ready for work and is adjustable to any thickness of stone or plate, to a height of five inches.

It saves time in mechanical handling.

The entire machine is *portable* at the immediate will of the *Portability*. operator. It may be carried to a drawing in any part of the establishment.

Once adjusted to the face of the work, you can move it, with the Shading Medium, at any angle desired on the drawing; remove it when in your way; and replace it for continuation of the work, when again needed, without further adjustment. *Adjustability.*

By means of the Holdfast the Shading Medium can be used upon stones of any area, large or small.

With its swing rods lowered to the level of its felt-edged base, *Ready Dis- placement to* it will be found especially useful in very large work such as drawings on card-board, paper, or architects' plans; or on large sheets *Different Parts of the* of aluminum or zinc for algraphic or zinc-surface printing, as it *Work.* can be lifted by its handles and placed on any part of said surface without injury to the work, if the latter be dry or protected by a cover-sheet.

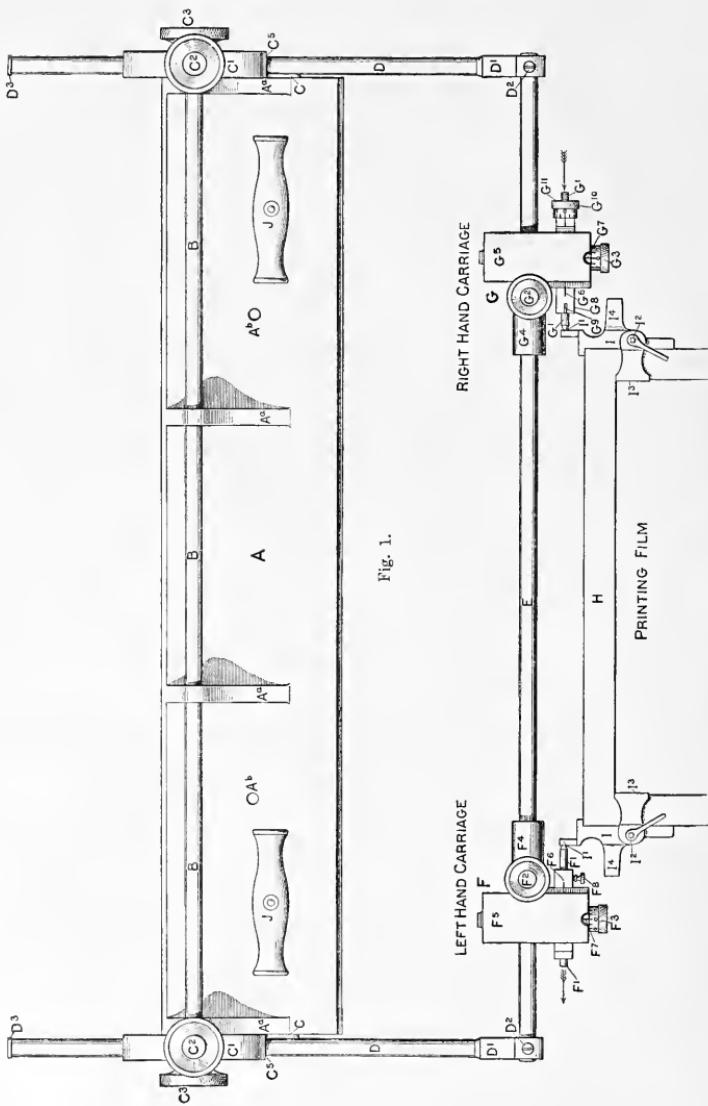


Fig. 1.

GROUND PLAN OF THE HOLDFAST.
SEE INDEX FOR DESCRIPTION OF SYMBOLS OF PARTS, AND PAGE NUMBERS OF TEXT WHERE MENTION IS MADE OF THEM.

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Description of Parts of Apparatus.

The drawings that accompany the text show the details of the mechanical adjustment of the machine and exhibit the apparatus placed in various positions on the work.

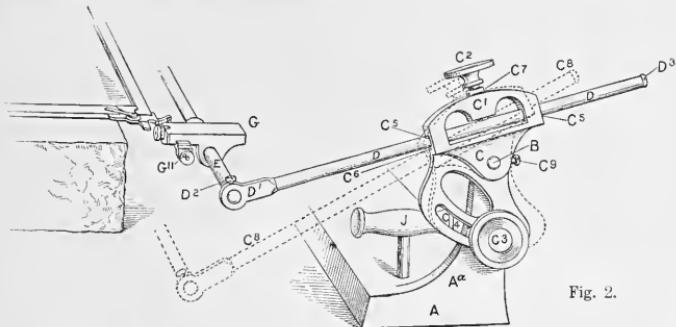


Fig. 2

SIDE VIEW (RIGHT) OF THE HOLD-FAST, SHOWING THE ELEVATING AND EXTENSION MECHANISM FOR ADJUSTING IT TO THE HEIGHT OF A LITHOGRAPHIC STONE.

The imaginary lines, C⁸ C⁹, illustrate the elevating movement of the sector wings C C, controlled by the sector slots C⁴ C⁴, and the clamping screws C³ C⁸. The extension movement is effected by the drawing of the side rods D D through the sector boxes C¹ C¹, which movement is arrested and controlled by the clamping screws C² C². See index for symbols of parts, and page numbers of where mention is made of them.

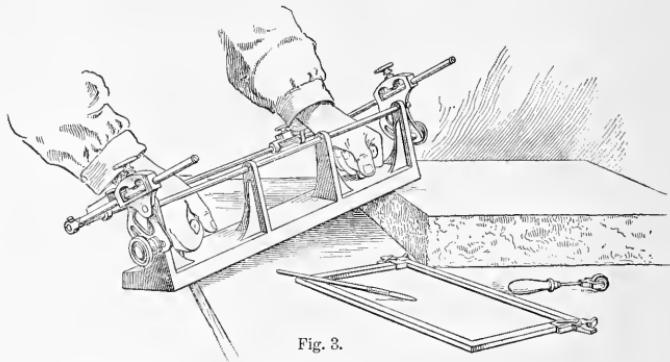
Figure I, confronting this page, is a ground plan. Figure 2 is a *Parts* side elevation. In Fig. 1, A is the base of the machine, which, with the Studs Aa, bears the rear cross-rod B. B supports the sector *Apparatus.* wings C C, which are provided with boxes C¹ C¹, through which slide the side rods D D. The side rods D D carry a forward cross-rod E, upon which move the sliding hinge carriages F and G. H is the frame of the printing film or Shading Medium and I I are the frame clamps attached to II, which are provided with sockets I¹ I¹, into which fit the pintles F¹ and G¹ of the sliding hinge carriages F and G, when the frame of the Shading Medium is locked in the apparatus for work. I I are also provided with

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levers with eccentric centres I^2 I^2 , which clamp the grips I^3 I^3 against the film frame, and also with ears, I^4 I^4 , which, when the film is raised, bear against the locking screws F^2 and G^2 of the sliding hinge carriages F and G , and serve to sustain the film at a resting slant when it is lifted and laid back by the operator for the purpose of consulting the work upon the drawing. The Holdfast may be lifted in its entirety by the handles J J ; a manual illustration of this will be found in Figure 3.

Adjustment to Different Heights of Surface ; Metal or Card-board.

Figure 2 shows how the adjustment of the Holdfast differs according to the height of the surface that has to be worked on. For drawings on card-board or metal see Figure 4. Although in this illustration the machine is placed upon a lithographic stone, it will readily be seen that this shows the principle of its application to work on any flat surface. Here the side-rods D D (see Figure 2) have been swung downward by the sector-wings C C so that the



PLACING THE HOLDFAST UPON A LITHOGRAPHIC DRAWING.

forward bar E , carrying the sliding carriages F and G , is about even with the base of the machine. If the surface of the card-board or metal is large enough, the Holdfast can be moved about at will over the drawing without any further mechanical operation except the adjustment of the different films desired in the sliding carriages. It can be used similarly, as shown, upon any

THE BEN DAY RAPID SHADING MEDIUMS

litho stone having sufficient dimensions to make this ready convenience possible.

If the card-board or the metal sheet be limited in size, then the Hold-fast must be rested on the drawing-board *outside* the work, and a slight adjustment made of the side-rod, thus raising the

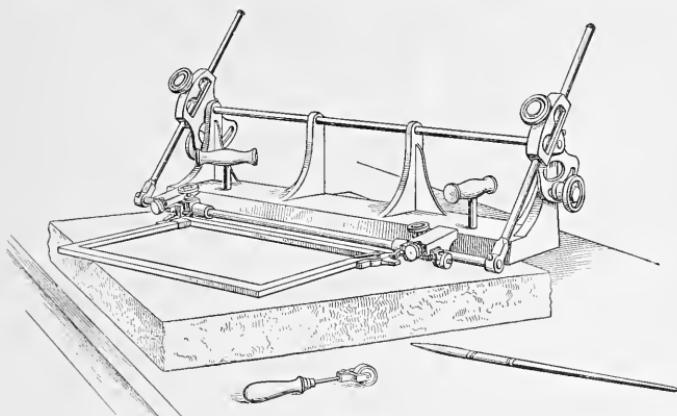


Fig. 4.

THE HOLD-FAST PLACED DIRECTLY UPON A LITHOGRAPHIC STONE, WITH THE SHADING MEDIUM LOCKED IN THE SAFETY ADJUSTERS.

[The Hold-Fast's application, here, would be the same for surface drawings on card-board or metal. This illustration shows the apparatus locked up in its closest compass.]

forward cross-bar according to the thickness of the plate or card-board. The principle covering this slight adjustment will be the same as that pertaining to the adjustment of the machine to a stone of any height to a maximum of five inches.

This principle is illustrated in Figure 5. Here we see the machine resting on the table outside the work with the side-rods D D elevated and drawn out to their fullest extension, so that the film is carried over the stone by what is practically a flying frame. This adjustment is accomplished as follows:

First unlock the clamping screws C² C² and C³ C³; lift the bar

Adjustment to Level of Lithographic Stone.

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E the elevation of which is regulated by the sector slots C⁴ C⁴, and draw the side-rod D D through the boxes C¹ C¹ until the bar reaches its full or partial extension as desired. These side-rod must be drawn *evenly* through the boxes so that they do not gag. Having drawn the bar over the stone see that it clears the stone

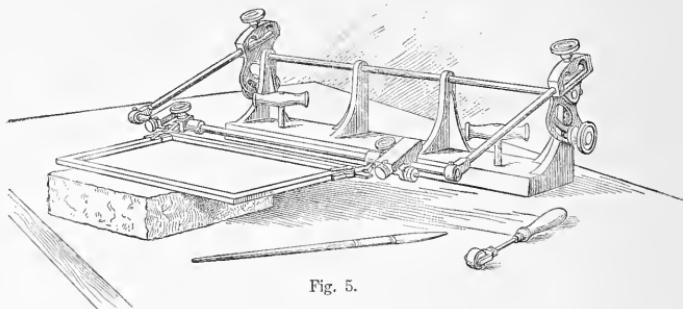


Fig. 5.

THE HOLD-FAST PLACED UPON THE DRAWING TABLE AND ADJUSTED TO THE HEIGHT OF A LITHOGRAPHIC STONE.

Here the Shading Medium is held by the extension frame run out to its limit. This shows the adjustment of the apparatus to one of the smallest stones.

from its surface in a parallel line about $\frac{1}{8}$ of an inch, first turning the sliding hinge carriages F and G from any tilt or angle they may have acquired in their former position of work so that they lie even with the stone. The general level of the machine with an eighth of an inch clearance from the surface of the stone being thus assured, then re-lock C² C² and C³ C³ securely. It is important to lock all clamping screws before starting in to work. The film may then be adjusted between the sliding carriages, as will be presently described. During the progress of the work, if it be necessary to change the position of the film for work upon other portions of the stone, the Hold-Fast may either be lifted and moved about the stone without further adjustment, or the stone itself may be swerved under the film to suit as in Figure 6.

Swerving the Film over the Stone or Shifting the Stone Under the Film.

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The adjustment of the Shading Film in the sliding carriages *Mechanism F* and *G* is a matter of the utmost importance. We will first describe these parts of the apparatus. Each carriage consists of a *the Shading sleeve, F⁴ G⁴*, with journalized bearings at each end, and a centrally located plug, dolly and set screw similar to that on the sector boxes

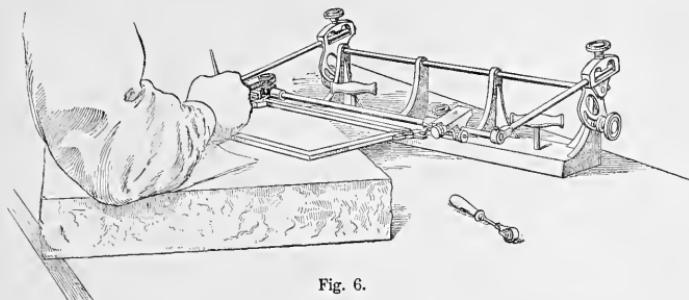


Fig. 6.

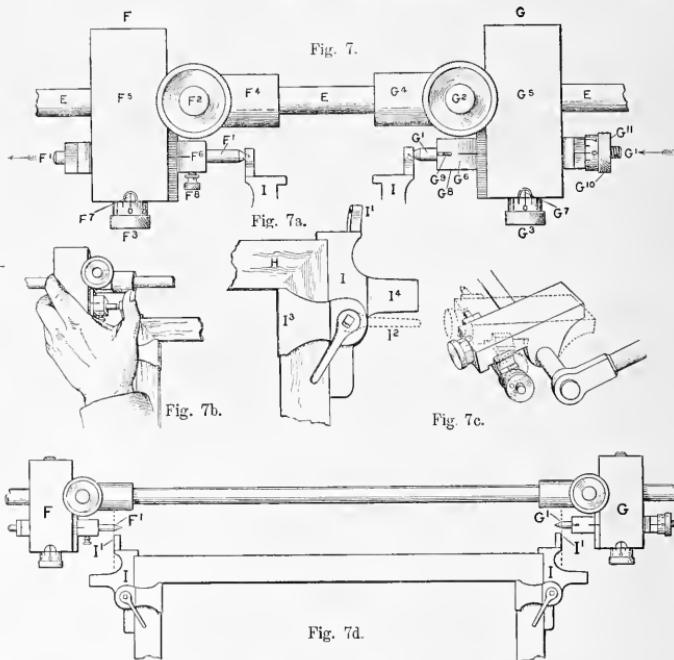
THE STONE MAY BE SHIFTED UNDER THE HOLD-FAST OR THE HOLD-FAST
MAY BE SWERVED OVER THE STONE.

C¹ C¹, which secures each carriage firmly to the bar *E*. The carriages can thus be secured to the bar *E* at any points in its length, *Sliding* and can be revolved on the bar so as to raise or depress the pintles carrying the film. This is a very important point of the mechanism, as it makes it possible to obtain an adjustment for a still nicer level of the printing film to the level of the surface on which the printing is to be done than that contributed by the sector movement at *C³*. In fact, this revoluble movement of the carriages on the bar *E* (see Figure 7c) is the factor which determines the final perfect level of the film with the stone.

Forming part of the carriages, and combined with the sleeves *Micrometric F⁴ G⁴*, are two covered boxes, *F⁵* and *G⁵*, in each of which a threaded shaft revolves by turning the protractor wheels *F³* and *G³*. These *Mechanism for Increasing* threaded shafts engage the threads of inner carriages sliding in *Color in a* fixed ways to give the inner carriages true movement without shake *Stipple or* backwards and forwards. Between the outer and the inner carriages of the members *F* and *G*, powerful spiral springs encircle

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the threaded shafts, bearing against the inner carriages and the inside ends of the boxes enclosing them. These springs are tensioned to constantly force the threads of the inside carriages against



*Note: Fig. 7a—
See Ben Day
Single Lever
Frame Clamp
opposite Index*

FIG. 7—THE IMPROVED SAFETY ADJUSTERS, OR SLIDING CARRIAGES, WITH THE IMPROVED FRAME CLAMPS.

Fig. 7a—The Improved Frame Clamp locked upon the film frame. The dotted lines show the lever open as the clamp is being placed upon or taken away from the frame. Fig. 7b—The thumb and forefinger used in adjusting the film in the sliding carriages or relieving the film from the same; see also Fig. 8. Fig. 7c—Illustration of the revolute or rocking movement of the Improved Safety Adjusters. Fig. 7d—Method of ready adjustment of the Shading Medium in the sliding carriages.

the threads of the shafts, thus preventing any back lash or lost motion when turning the protractor wheels to the right or to the left. On the inner side of each carriage, F and G, where

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the pintles F^1 and G^1 project, two guide marks, F^6 and G^9 , one on the moving carriage and one on the fixed carriage, show the mean position of the inner carriage when the tension of the concealed spiral spring is at its most resilient point of pressure. *Importance of Register* is important then to keep these marks in register when starting *Marks*. a series of movements forward or backward by turning the protractor wheels to the right or to the left.

The inner carriages, or sliders, are each furnished on the side towards the operator with two dependent lugs in which the pintles F^1 and G^1 are journaled. The left hand pintle F^1 is tensioned between the lugs by a spiral spring, which recedes under pressure when the socket of the left hand frame clamp I is pushed against the point of the pintle. The right hand pintle G^1 is stationary except when given a slight movement by rotating the protractor wheel G^{10} . G^{10} is bored and threaded to fit the threads cut on the outer end of the right hand pintle G^1 . A powerful spiral spring encircling this pintle, tensioned by a collar and pin, draws G^{10} against the stud where G^{10} impinges and takes up the lost motion when G^{10} is revolved to the right or left. G^9 is the centre of the movement of G^{10} marked 0 or zero, and acts both as a steady-pin for the pintle G^1 and a guide to show the lateral position of the film as G^{10} is revolved.

We now arrive at the adjustment of the Shading Medium in *Adjusting the* these carriages. We will suppose the extension and elevating me- *Shading* chanism of the Hold-Fast already adjusted to the surface on which *Medium in* the drawing has been made. Having decided which part of the *the Sliding* drawing we wish to shade, we take a clean un-linked film of the *Carriages*. desired pattern and put on and fasten to the film-frame the right and left hand frame clamps I by turning the levers I^2 I^2 until the eccentricities of the same have tightened the grips I^3 I^3 against the inner edge of the frame H . See Fig. 7^a. Now place the Shading Me- *Frame Clamps*. dium, mounted with its frame clamps, flat on the drawing in a position approximate to where it is to be used. Then move the Hold-Fast into place so that the rod which bears the sliding carriages is parallel with the frame of the Medium, and about an inch and a quarter distant therefrom. Each of the pintles F^1 and G^1 is coned to an exact guage. The sockets I^1 I^1 of the frame clamps

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Hinging the Medium in the Sliding Carriages.

Spring Play of Left Hand Pintle.

Leveling the Medium Upon the Face of the Work.

are bored to an exact guage. Move the sliding carriages F and G along the rod until the outside of the socketed ends I¹ I¹ are in line with the termination of the cones of F¹ G¹ as shown by the dotted indications in Fig. 7^d. Screw the carriages, then, securely to the rod; lift the film, and with the left thumb and forefinger, as shown in Fig. 7^b, press the left hand socket I¹ against the spring pintle F¹, which will recede about $\frac{1}{4}$ of an inch. Then line the right hand socket I¹ with the pintle G¹, when the Shading Medium may be sprung from left to right to engage these members with each other. The film may now be considered securely mounted, as the spiral spring of F¹ brings its tension to bear against both pintles, keeping them sufficiently tight to prevent any lateral displacement of the film when the operator is rubbing in the print, and yet allowing sufficient resilience for the dis-engagement of the film from between the pintles at any time when re-inking may be desired, after which operation the film may be re-adjusted with perfect registry. Having locked the film, as described, in the sliding carriages, you must now look to its absolute level upon the face of the work. First, see to the general even adjustment of the sliding carriages above the surfacee of the work. The bar E, carrying the sliding carriages, as we have mentioned, should be about $\frac{1}{8}$ of an inch above the level of the stone. In fact

it will be well to see that the journal sleeves F⁴ G⁴ have some clearance also, in case you have occasion to swerve your stone under the apparatus. This adjustment is achieved, as before described, by the raising or lowering of the rod E. If the film now should fail to lie perfectly flat upon the work a closer adjustment must be obtained by revolving either or both the sliding carriages F and G, up or down as may be desired. See Figure 7c. You can adjust films of other textures without changing the level you have established if the frames are of the same thickness. Thicker frames have to be slightly re-adjusted. The film frame should lie on the work as it would if free from any attachments.

Being ready to shade the drawing, now take out the film for inking. This is best done, with the least chance of deranging the apparatus, by placing, as suggested above, the fore-finger of the left hand on the left hand side of the box F³, and the thumb at the back

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of the socketed wing I', in which the left hand pindle enters. *Relieving the Squeeze with the thumb, against the counter action of the fore Film with finger; the left hand pindle recedes, and with it the frame and the Thumb and right hand frame clamp until its socket is freed from the right Forefinger, hand pindle and the film is detached from its bearings.* See Figure I, Figure 7^b and Figure 8 for detailed and general illustration.

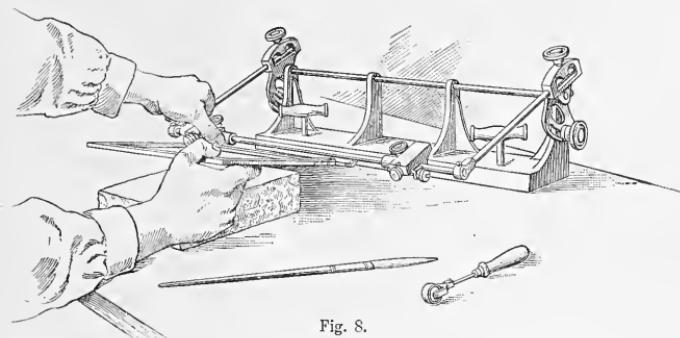


Fig. 8.

ADJUSTING THE SHADING MEDIUM IN THE REGISTERING CARRIAGES, OR REMOVING THE SAME THEREFROM.

For detailed drawings see Fig. 1 and Fig. 7^b.

To get your film ready for a neat, sharp print, first lubricate the *Back of* back with the smallest amount of vaseline rubbed on (and off *Medium* again as much as possible) with a piece of cloth, until you have an *Should be* even, smooth, light coat. A ten per cent. solution of benzine and *Perfectly* wax may be used instead of vaseline, if preferred. This *Lubricated*. lubrication is absolutely necessary as it allows the stylus to slide over the back without friction, and without swerving the film by side pressure. Settle the film truly on its pad, printing-face up, taking care to have the frame clamps I I *outside the table edge*, as they, being thicker than the film frame, would interfere with the perfect settlement of the film upon the pad. Figure 9 illustrates this principle.

Dust off the face of the film, and roll it up with a light charge of ink and the least amount of pressure on the roller, but with frequent rollings, until, when examined with a magnifier, the lines

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Inking the Film.

Stencils.

or dots look as if they have received the same amount of ink and are all clear and black. (See general directions for Ink and Reli-
ller). Now cut out a stencil, in onion skin or French folio paper, to prevent the film and its binding crocking the stone where the texture is not wanted; that is, if these parts have not been masked

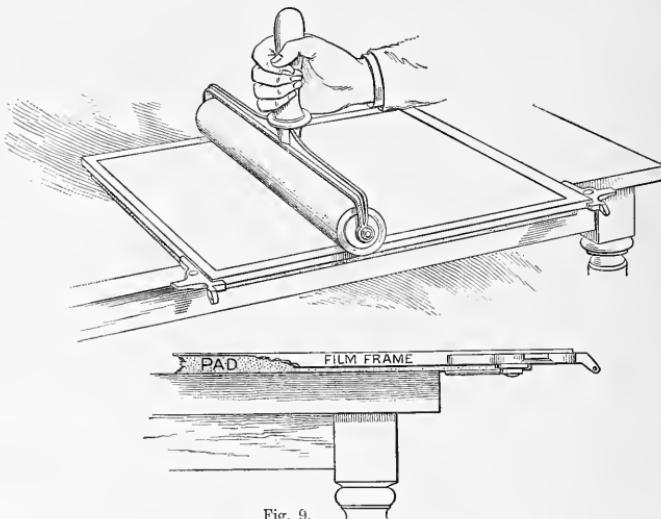


Fig. 9.

INKING THE SHADING MEDIUM.

The Frame Clamps must lie clear of the edge of the work table, so that the film may be supported truly by the pad.

Replacing the Film in the Sliding Carriages with Thumb and Forefinger.

Transferring the Tint with the Stylus.

with gum. Place this over the drawing, and swing the film in its bearings F¹ G¹ as already described. Print your texture by rubbing the back with the pressing tool where wanted, lifting and lowering the film carefully to observe the work. If the print needs fortifying, now is the time to re-ink the film, replace it, and add another charge on the print already laid. This should be laid with a lighter pressure of the tool, otherwise, the heavy pressure displaces the charge on the stone leaving an edge of ink around the dot, or the sides of the line that has been printed, and does not fortify the work.

Do not hold the frame; the pintles will do that. If you must hold something, place your finger on the centre of the frame side toward you; *but if you do this, do it during all the work*, putting your finger in the same place on the frame each time. It is best, however, to rely entirely on the devices provided to hold the frame, and on the care with which you have adjusted the face of the printing film to the level of the stone. Very fine textured films, beyond the 120 line or its equivalent in stippling, have to be *Careful Adjustment* manipulated with the greatest care. Every mechanical device *justment to* necessary to print these properly is embraced in the Hold-Fast, but, *Insure Registration* if they are not all carefully adjusted, you can never count on the *try—Lock all* result. Improvisation to save time, is bad practice. Get into the *Clamping* habit at once of attending to all the details. Before starting work *Screws*. see that all the clamping screws of the Hold-Fast, C² C², C³ C³, F² and G², are securely locked to prevent movement. There is a minor lock-screw, F⁸, which may be locked, or not, as the operator elects. The object of F⁸ is to bind the spring-pintle of the carriage F so that the pintle is in no danger of being sprung if the operator is working with an extremely fine tint like No. 21, for instance, which, being 240 lines to the inch, must be held most rigidly between the hinge carriages. It must be understood, however, that F⁸ must be released again before you can take out the film for re-inking. F⁸ is simply intended as a measure for extra safety in certain emergencies. Ordinarily, it may be left open. G⁸ is a steady-screw set in companion position to F⁸, presenting itself against the flattened part of the pintle bar G¹. It is a silent member of the mechanism and need not be operated.

The devices for increasing color in parts already printed are *Devices for* absolutely as near perfection as it is possible to make them. On *Increasing* the three protractor wheels, F³, G³, G¹⁰ all lost motion is prevented *Color*. by powerful spiral springs. G¹⁰ drives the pintle forward and backward in total a scant 1-32nd of an inch. Further movement is prevented by a stop boss G¹¹ entering a circular recess in this wheel. The object of this stop is to restrict this motion so that the steady pin G⁹ attached to the pintle G¹ which keeps said pintle from turning, may always slide in its groove without the possibility of its leaving it. Its length before entering the groove prevents

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Lateral Movement of Right Side Protractor Wheel.

the slightest lateral change in the pintle when moved by turning G^{10} . G^{10} should always be set at 0, or zero, on the index, and the changes made by turning it alternately from right to left. This gives a lateral movement to the film and is ample for any increase of color laterally.

Horizontal Movement of Front Protractor Wheels.

The horizontal increase of color is governed by F^3 and G^3 . These should also always be started with 0 at the indexes F^7 G^7 and at the same time the lines on the sliding carriages F^6 G^6 should line with the lines on the bearing, as at this point the spring does its best work in taking up lost motion. These guides, with the numbered spaces on F^3 and G^3 , assist greatly in keeping a record of the movements made.

Increased Pressure will not give a Pure Increase of Color.

It will be seen by these various devices that you can make prints on your work giving the greatest variety of shadings to the work first printed with an accuracy unapproached by any less carefully divided mechanism. At each movement the film must be taken out, re-inked and replaced in its new position. Never trust to increased pressure to thicken the work; film work won't hold, when crushed against the stone. You want just sufficient pressure to have the printing face of the film touch the stone and yield up its ink—no more. This is especially true of the finer textures.

Fastening the Holdfast to the Table if Desired.

While the entire apparatus of the Hold-Fast is portable, if the operator wishes to use the machine in a fixed position this is perfectly possible by means of screws fastened to the table through the base holes A^b A^b .

If any part of the Hold-Fast should get out of order, refer to Figures 1, 2 and 7 of the detailed illustrations and write or telegraph the section number of the damaged part.

Instructions for Inking and Manipulating the Ben Day Rapid Shading Medium.

This section is devoted to general observations for the benefit of the operator. Any recapitulation of points that have been touched on before, is due to our desire to impress upon the operator the absolute necessity of such points being observed.

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As an absolutely rigid tint, or film, would be unworkable, it is necessary that there should be sufficient flexibility in the film to enable the operator to print its texture on the work in minute sections—if he so desire—or in broad reaches, if preferred. To do this successfully, the operator must bear in mind several points of importance; first, that a flexible film, no matter how tautly mounted must of necessity be subject to every variation of pressure put upon it by the pressing instrument; second, that the value of its stipple, line, or texture is dependent also upon the manner and measure of its inking; third, that the film being more sensitive in damp, warm weather than in dry, cold weather, the effect of such conditions must be calculated.

Directions, in detail, are as follows:

While the Hold-Fast is a portable and not a “set” machine, and may be carried to shade a drawing in any part of the establishment, it is nevertheless better to observe the custom usual with *One Corner* our former apparatus and reserve one particular table for *Ben for Ben Day* Day work. The Hold-Fast and all the Mediums, with the inking *Work*, slab, composition roller, and the various pressing instruments, etc., are thus kept together and handy to each other. The advantage of this being evident, it should be seen that the table on which the work is to be done is a solid one, secured to the floor so that it *Level Work* does not shake or rock. The surface of the table should be *perfect Table*. *ly level* also, so that the stone and the base of the Hold-Fast will lie flat upon it. In the case of drawings on metal or card-board this will be just as necessary, as the drawing-board upon which these latter are mounted must find a solid level also. This matter of table level is most important.

The steadiness of the work table being seen to, the inking slab *Inking Slab* should, if possible, be cased in on a low separate side-table, so that *on Side* the vibration due to rolling up may not disturb the registry of the *Table*. work on the drawing. The slab should be preferably of stone to give it solidity, and about the size of 16 x 18; never of glass, and, if of metal it should be a similar sized piece of thick zinc, finely grained, and screwed securely to the table. On a shelf, beneath this table, should be kept the box containing the inking roller. The

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*Shelves for
Appur-
tenances.*

roller, when not in use, should be kept in the box. On a shelf, over the inking table, should be kept a safety-can full of benzine and some soft rags for cleaning the films. Here, also, keep your inking pads.

*Rolling Up
Slab with
Roller.*

For the proper inking of the Mediums see that the inking slab and roller are lightly, but evenly, charged by a *thorough distribution* of the ink, through frequent rolling upon the slab. The slab should be rolled until it and the roller present an even, velvety appearance.

To ink the film, place it *evenly upon its pad with the frame clamps lying outside the table ledge* and draw the roller lightly over it several times in *one direction—toward you*. Then recharge the roller upon the stone and repeat. Do not use undue pressure of the roller upon the film; the sensitive qualities of the film and roller are sufficient to effect a perfect transfer of ink from one to the other. Excessive inking produces a smudgy result and adds nothing to the strength of the work. *Thorough distribution* is the main point.

*Different
Inking for
Different
Films.*

Follow, in your art room, the *principles of a relief printing department*. All printing work cannot be inked alike. Neither can all films. Printing depths vary, always, with the face value of the plates. Fine half-tones, fine stipples, fine line tints cannot possess the depth of plates of bolder character. Judgment, therefore, must be used in inking them.

The film being properly inked, see that it is carefully placed in the registry apparatus so that it is held securely, and yet has sufficient hinge-play to admit of its being easily relieved for re-inking, if necessary.

When applying the shading to the drawing, use either the agate stylus or the rubber roller. The pressure must be regulated by the face value of the tint you are using. More pressure is required to put down a dark tint than a light one, just, as in the inking, the dark one requires more frequent rolling.

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Hence, in using the stylus, or pressure roller, on the back of *Caution about the Medium, be sure and use only sufficient pressure to print the too Heavy dot, line or texture you are putting down.* Never resort to the *Pressure* with expedient of varying color by pressing heavily on the Medium in *Stylus and* order to swell the print. The elastic quality of the Medium is *Roller.* intended to insure perfect contact, and, hence, a perfect print. The pressure required will vary, as we have intimated, with the

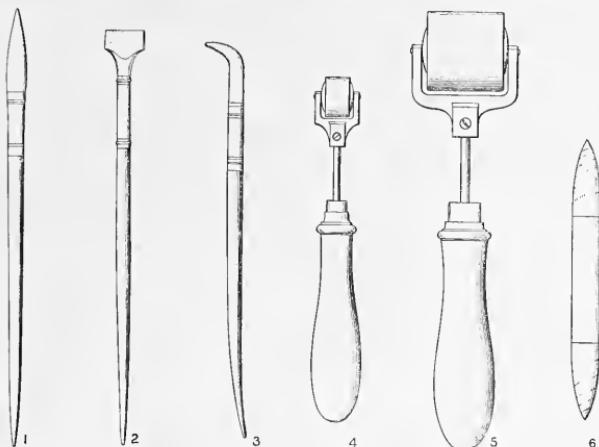


Fig. 10.

DIFFERENT STYLES OF PRESSING TOOLS.

1. Pointed Stylus.	4. $\frac{3}{8}$ -inch rubber pressing roller.
2. Flat Stylus.	5. $1\frac{1}{2}$ -inch rubber pressing roller.
3. Hook Stylus.	6. Paper, or leather, stump.

weather, more being required in cold, dry weather, than in warm and damp weather. The darkening of a tint *must* be produced by re-inkings and movements, not by forced pressure. You can get from a tint only its true face value in color. Varying color by pressure spreads the ink, detracts from the sharpness of the print, and the result is weak for either etching or photo-engraving.

In using the agate stylus, see that your pressure is even, and in touch with the responsive quality of the film. The back of the

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More about Lubrication of Back of Film. Medium must be kept perfectly lubricated so that it offers no resistance to the free manipulation of the stylus. Upon this depends much of the success in laying a pure tint. Each film, as it is sent out from us, is lubricated properly, but, with use, it will lose its smoothness of surface. To renew this surface apply, with a soft rag, a little vaseline, or a ten per cent solution of benzine and wax, and polish with a piece of dry flannel.

Use of Different Pressing Instruments. Observe care, in using the rubber roller, to prevent squelch in the tint. A slip-sheet of blotting paper on the back of the film will prove an advantage, easing the effect of the roller, and thereby facilitating perfection in broad reaches of flat tints. There are two sizes of rubber rollers, as shown in the illustration of tools above. One is $\frac{3}{8}$ of an inch wide, the other an inch and a half. Where the tint is very light and delicate, as in the case of film Nos. 517 or 532, a paper or leather stump may be found serviceable. The rubber roller is of value only in putting down light or medium-faced tints, and it must be remembered that the greater the width of the pressing roller, or other instrument, the less its efficacy for laying down strong values of tints. Heavy tints require the more local pressure of the stylus. Of the stylii there are three different kinds; the pointed, the flat, and the hook. Every operator has his peculiar fitness for the use of a certain tool, but it may be stated here that, of these three instruments, the pointed stylus is the most useful. It can do all that the hook stylus can in the laying of flat tints, and more when it comes to working close to an outline. The flat stylus is an excellent tool, also, in the hands of the man who knows how to work it. On account of its breadth, it can be used only for tints of light or medium value, and it is absolutely essential that it be worked upon the back of a film that is well lubricated. The tool must slip readily over the film and the motion of using it must be that of a short, smart sweep rather than a heavy bearing upon the surface of the film.

Always guard against too long a sweep with any of the pressing tools. A sweep of three inches is sufficient. Beyond that, the hand has a tendency to make the tool describe a curve, and when the operator comes to work upon another lap of the tint that he is laying down, he is often confronted with the discovery

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that his two lays of color have been thickened at the point where *Even Lay of Color.*

Lay your tint down by first intentions, if possible, if you are using a stylus. Do not labor over it, as constant friction expands the film and forces it from its original lay, again spoiling the evenness of your tint. One good plan toward obtaining a pure lay of color on a large scale is as follows: make the first lay of color by means of the rubber roller, passing the roller over the film with gentle pressure, and making no attempt to immediately obtain the absolute value of the film. Then finish with the stylus, or work more positively with the roller, as you prefer. The idea of this method is to have the stone, or card-board, on which the drawing is made, absorb a preliminary pale stain of the film pattern, so that when the stylus or roller is used to perfect the lay, the ink cannot spread as it would if its full charge had been abruptly transferred at the start. This principle would not be so serviceable for metal on account of its non-absorptiveness.

General Remarks, with Some Repetitions.

Apart from the variety of effects to be obtained by the shifting movement of the Medium, as a means of varying color, there are endless resources in the combination of the various tints and textures worked upon, or intermixed with, each other. But these must be combined judiciously. Some combinations result in *patterns*, which might be inappropriate in either black or color work for the artist's subject. It may be said, in general, that all straight-lined tints in combination with wave-line or graduated tints form a watered pattern; that all mechanical stipples form with themselves, or other mechanical tints, set patterns even when used in the different colors.

Combination of Textures.

The best effect in combining line tints, is in crossing them at right angles; three crossings of a line tint at angles represented by an equilateral triangle is all that can be done with it, without producing ugly patterns.

Hand-drawn stipples mix well with themselves, with grains, or fine half-tones.

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Certain line tints, notably the finer ones, combine well with certain hand stipples.

Mediums No. 434 and No. 435, also the half-tone tints, will make excellent fillers to fortify work imperceptibly both in the body and vignette parts; but they must be used for this purpose judiciously, so that they will not offend in combination.

Should the ink have a tendency to dry upon the slab and roller during the day, a few drops of turpentine put upon the slab, and rolled up until *thoroughly incorporated* with the ink, will freshen it without impairing its strength. But when resorting to this expedient, be sure to allow the turpentine to evaporate well and the ink to become quite firm again before inking the Medium. Otherwise, with the ink too thin, the Shading Medium cannot be purely inked.

Keep the roller, and the ink upon the stone, clean and free from dust. The inking roller should never be rested upon its face; always rest it upon its metal bearings within its case.

When inking a Medium, be careful not to remove the frame clamps from it, or it will not register when the clamps are replaced; when inking, also be careful to let the hinges hang over the edge of the table, which gives you an even bearing upon the pad and may save you a breakage of the Medium.

When gumming-out on stone or zinc, be sure the gum is dry before applying the Medium.

Clean the films every day, before they are put away, with benzine and a soft rag. Clean the stone and roller also. Ink, left over night, cakes on all surfaces and the expedient of "freshening up" is a bad one. Use sufficient benzine. The ink should be flaked off, so to speak, the rag or brush merely assisting its removal. Anything like scouring treatment, serves to rub the ink into the Medium, thus staining it. If you wish to re-ink a Medium immediately after cleaning, allow it to dry well first. A Medium should be cleaned, invariably, before attempting to lay any large stretch of pure color. If not, it will show the patterns of the work done in previous usings.

Turpentine used for cleaning leaves a gummy residue upon the film. It is excellent for cleaning, otherwise, because it does

Placing the Medium on the Inking Pad.

Cleaning.

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not evaporate too quickly. But benzine should be used finally to remove the gum of the turpentine.

If, for some reason, a film should not ink readily, look to your roller and see if it picks up the ink properly. If it does not, its surface has been rendered repellent by some accidental affection of oil or grease in handling, or, if the weather be damp, moisture has affected it, thus foiling the ink. The expedient, in this case, is to clean off the roller with benzine and, to be sure that the fault is not with the film, clean that off, also.

We would again emphasize the fact that too much attention cannot be paid to the delicacy of the inking, and to the judgment of inking the films differently according to their different face values. For instance, if you are using Medium No. 1 (dark line tint), or No. 424 (dark stipple tint), you must not expect to use the maximum charge of ink required by either of these films for the inking of No. 435. In this case you must deplete your charge by "rolling off" on another plane of metal or stone, or wash off completely, and roll up your slab again with a lighter quantity. Indeed, to avoid trouble and loss of time, and to achieve, especially, unvarying excellence in results, we think that two inking slabs should be employed, one for fine, and the other for heavy tints and textures.

Sometimes, in winter, the inking roller and ink slab refuse to take the ink because they are too cold, especially in the opening work hours of the morning. In this case, the ink slab should be lifted out of its casing and the chill taken out of it near the steam-pipes.

Keep the Shading Mediums away from all extremes of temperature. Extreme heat or extreme cold is not good for them. See that the Mediums are not kept near the steam-pipes and do not leave them lying by the window for attack by the sun or moisture. When not in use, keep them in their boxes.

Friskets, or stencils, for the covering of work, when resorted to in place of gumming-out, should be cut if possible in a blank sheet the full size of the drawing, and held to the margin of the work by small pieces of bees-wax.

In rolling up your ink slab, it is important to start with a

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*Even Ink
Fountain.*

spread of ink-feed at the head of the slab drawn evenly across the stone with a palette knife, so that the roller may draw from this fountain an even charge all over the slab. *Never spread ink upon your roller with the palette knife.*

*Modern Progress in the
Printing Art.*

The emphasis placed by us upon the necessity of working all the appurtenances pertaining to the Shading Medium with care, will be understood by the operator when it is considered that the Day Shading Medium is one of the many important factors that go to make up the perfect printing establishment of to-day. The conditions of the printing art, at present, are more rigorous than they ever were before, and the trend toward finer results is increasing every day. The wonderful improvements made in printing machinery within the past few years, and the revolution which has taken place in the manufacture of special papers for both lithographic and relief printing, prove the insistence that must be placed upon having all kindred adjuncts work perfectly. Thus, if special papers and special presses are being made to print color plates to a higher degree of perfection, it follows that the Ben Day Shading Medium which is the machine that *makes* the color plate, must be handled with as much skill and precision as is insisted on in every other department through which the color job passes in the processes that tend toward its completion.

The Ben Day Tubular Roller.

(U. S. Patent, July 7, 1896.)

This was invented purposely for inking the Ben Day Rapid Shading Mediums, and has so far been retained exclusively for that purpose. It provides a surface that is firm, yet sensitive, which picks up the ink in the finest quantity and distributes it in proportion. It is mounted on a tube, but not fastened to it. Climatic changes, therefore, affect it equally. It cannot dish through shrinkage and must always present an even bar to the surface of both the roller and the film. Its hollow mandril and aluminum frame make it light to handle and hence a more perfect instrument for the delicate inking required by the Shading Mediums.

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The roller mount consists of a frame A, a shaft B, and a hollow mandril C. D is the tubular roller drawn over the mandril. At *of Parts.* the left end of C, E¹ is a drilled centre-plate bearing for the shaft B, and E², a screw-hub, which is a part of same and on which, after the roller is mounted, the end cap F is locked, to keep the roller flanged in its position on the mandril. The end of the shaft B entering the left hand arm of the frame is threaded and this end arm of the frame is threaded also to receive the shaft which when driven home, is secured by the lock nut G. Only the left hand arm of the roller is shown in the drawing, the one that embraces the

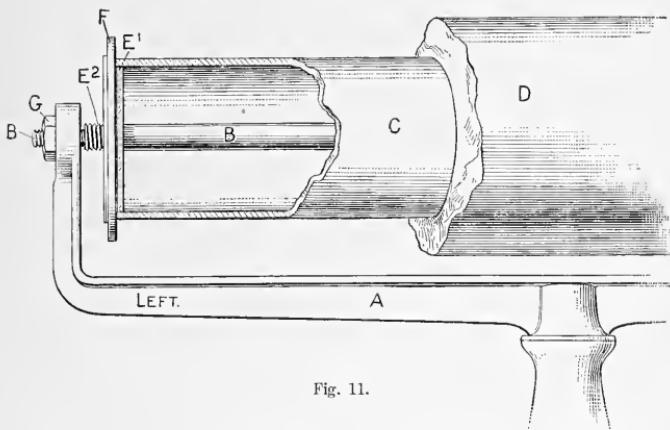


Fig. 11.

THE TUBULAR ROLLER.

detachable parts of the mechanism necessary for removing an old roller and replacing it with a new one.

To remove the roller tube and mandril, first, take off the lock *Removing and* nut G; unscrew the shaft B from the end of the right arm, with- *Replacing* draw it, and the roller and mandril will be free. Now remove the *the Tube.* end-cap F by unscrewing it from the screw-hub E², pull off the old roller tube D, and put on the new one. This latter must be done gently, so as not to distort the roller tube. When the new roller

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is on the mandril, replace the end-cap F, restore the shaft B, and when the latter has fully engaged the thread of the left hand arm of the frame A, secure the whole again by the lock-nut G. The roller is now ready for use.

It sometimes happens that in putting on a new roller tube, the material of the roller is crowded and the tube seems too short. By grasping the roller tube with both hands at the centre, and pulling it counterly right and left, in a direction away from the centre, you will bring the roller back to its normal length.

Benzine Wash for Roller to Remove Grease and Moisture.

Before starting in for the day's work with a roller, it is well always to give it a preliminary wash with benzine. This will remove grease and finger marks all of which help to foil the pick-up of the ink. The benzine wash is especially useful in damp weather when the roller is surcharged with moisture, and sometimes on this account refuses to take the ink. The benzine being a quick evaporant, helps dry the surface of the roller and puts it in better condition for rolling up.

Keep Roller Clean and in Box when not in Use.

If these rollers are kept in the box at all times, when not in use on the stone, and are cleaned with soft rags free from buttons, hooks and eyes and other scratching media, they will practically last for years. We have used the same roller daily for proving the Mediums, before issue, for over three years and found it at the end of that time really better than a new one. The roller represents a curved plane carrying the ink, with which it is charged, to the plane or printing surface of the film. As the plane of this film is often divided into monticules, sixteen to twenty thousand of which are contained within the area of a square inch, it will be seen that a clear roller free from specks and dirt is required to ink such tints properly.

Clean the roller and its inking slab every day. Clean with benzine. *Never use water or lye.* When working with fine half-tones or hand stipples, do not leave the roller lying on the slab during the interim of working the Mediums. If you do, the lower arc of the roller will flatten itself on the stone and a "bar" will appear that will affect the re-inking of the Medium, unless it is eliminated by careful and continued rolling up. By restoring the roller to its box after inking this trouble will be obviated.

The Ben Day Aluminum Pad for Supporting Printing Films.

(U. S. Patent, December 31, 1901.)

For the perfect inking of the Shading Mediums, the supporting pad plays an important part. The present invention is a great improvement upon the plane surface heretofore used for that purpose. The pad is constructed of two sheets of thin aluminum, each about the twenty-fourth of an inch thick. Between these, is imprisoned a cushioning of felt or other elastic material.

The cushion between the two plane metal surfaces causes the supporting surface of the pad to yield slightly as the inking roller passes over the film; while its resiliency restores the plate to its former level after the inking is done. In other words, the object of the aluminum pad is to provide a level and non-warpageable surface for the inking of the very finest textures, which will at the same time readily accommodate itself to the action of the flexible composition roller passing over its printing-surface without inking the interstices, or intaglio parts, surrounding the textures in relief. If the metal surface of the pad is dented, or otherwise injured, its utility will be destroyed. By returning the pads to the compartments in their case, after using, there will be no danger of accident to them. They should last for years. Should the pads become fouled with ink or grease, clean with a rag and turpentine. Keep the mat surface of the pad always clean. This will give you a white ground, against which you can see the texture of the film while inking it.

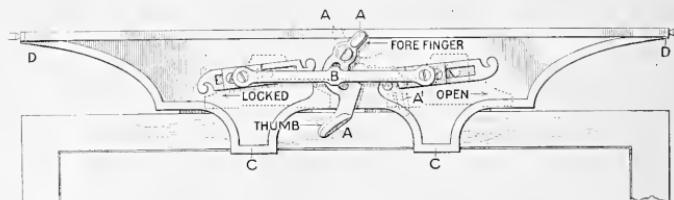
*Advantages of
Cushioning and
Metal Plane.*

*Care of the
Aluminum
Pad.*

ADDENDA

The Ben Day Single Lever Film Frame Clamp

U. S. Pat. Nov. 30, 1909



A NEW device for the adjustment of the Ben Day Rapid Shading Mediums. An improvement on the eccentric frame clamps, the mechanism being embraced in one member instead of two. The single lever, A, shows the clamp locked to the film frame. A' shows the clamp open. The lever is moved by the thumb and forefinger as indicated in the drawing. The lever bar, B, carried by the lever, A, moves the two flying wedges, A', locking the film frame against the jaws, C, C.

Press the clamp flatly home upon the film frame before locking. In inking the film, the clamp must hang clear from the edge of the table. Toward this end have the edge of the aluminum inking pad flush with the edge of the table. (See "How to work It," page 12, Fig. 9.) Do not ink the film until all adjustments are made. D, D shows the pintle sockets which engage the revoluble hinges of the main apparatus.

ADVANTAGES

One working member instead of two. One lever movement instead of two. Clamps the film frame at any point within the space occupied by the holding jaws on any part of the film frame.

Extends the area available for the setting of the registry hinges to the right or to the left of the holding bar and holds the largest film frames firmly in place on the bar when fixed in position.

Makes it possible to change a film without disturbing the setting of the registry hinges.

No end strain on the corners of the frame. The registry is metal to metal, not wood to metal.

Quick adjustment of the film, quick disengagement, quick replacement.

No soiled hands for the artist. No finger contact needed with inked edge of the film.

fits any film frame.

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A ^a , studs of base, . . .	2, 3	F ⁶ , guide mark, showing movement of F ³ , . . .	2, 8, 9, 14
A ^b , base holes, . . .	2, 14	F ⁷ , index of F ³ , . . .	2, 8, 14
B. —B, rear cross-rod, . . .	2, 3	F ⁸ , steady screw of pintle F ¹ , . . .	2, 8, 13
C. —CC, sector wings, . . .	2, 3, 4	G. —G, right-hand sliding carriage, . . .	2, 3, 4, 6, 7, 8, 10
C ¹ C ¹ , sector boxes, . . .	2, 3, 6, 7	G ¹ , right pintle, . . .	2, 3, 8, 9, 10, 12, 13
C ² C ² , clamping screws of sector boxes, . . .	2, 3, 5, 6, 13	G ² , clamping screw of carriage G, . . .	2, 4, 8, 13
C ³ C ³ , clamping screws at sector slots, . . .	2, 3, 5, 6, 7, 13	G ³ , right front protractor wheel, . . .	2, 7, 8, 13, 14
C ⁴ C ⁴ , sector slots, . . .	3, 6	G ⁴ , journal-sleeve of carriage G, . . .	2, 7, 8, 10
C ⁵ C ⁵ , sector box journals, . . .	2, 3	G ⁵ , thread box of carriage G, . . .	2, 7, 8
C ⁶ C ⁶ , steel keys of slotted side rods DD, . . .	3	G ⁶ , guide mark showing movement of G ³ , . . .	2, 8, 9, 14
C ⁷ C ⁷ , plug entered by set-screws C ² C ² , . . .	3	G ⁷ , index of G ³ , . . .	2, 8, 14
C ⁸ C ⁸ , imaginary lines showing elevating and extension movement of side-rods DD, . . .	3	G ⁸ , steady screw of G ¹ , . . .	2, 8, 13
C ⁹ C ⁹ , screws securing sector wings to rear cross-rod B, . . .	3	G ⁹ , steady pin, . . .	2, 8, 9, 13
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F. —F, left hand sliding carriage, . . .	2, 3, 4, 6, 7, 8, 10, 13	I ² I ² , eccentric lever of frame clamps, . . .	2, 4, 8, 9
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